REMARKS

Claims 1-13 are pending in the application and are rejected under 35 USC § 103 as being unpatentable over Japanese patent publication 04-221912 (referred to as "Masataka") in view of US patent 5,383,118 (referred to as "Nguyen"). The Office Action indicates Masataka teaches an optical module with all features that are claimed except for passive alignment, that Nguyen teaches such alignment techniques, and that it would have been obvious to use the alignment techniques disclosed in Nguyen to align the optical module disclosed in Masataka to reach all claim elements.

Applicant amends the claims as shown above and requests reconsideration. Neither Masataka nor Nguyen, either alone or in combination, disclose all features of the amended claims.

Masataka discloses an optical fiber array terminal (12) with a plurality of optical fibers (26) that are aligned with a plurality of light-emitting or light-receiving elements (23) mounted on a submount (22). A ferrule (25) is provided to support the optical fibers (26). A spacer (11) is inserted between the submount (11) and the optical fiber array terminal (12) to regulate the space between the optical elements and the optical fibers. Masataka teaches aligning the components through processes that rely on bump contacts (13) and/or through holes (15) and pin-like projections (14) (see Figs. 3 and 4) to establish proper positions.

Nguyen teaches an alignment technique that uses cameras or other image-forming devices to establish relative positions of an optical device and an end of an optical fiber that are each carried by separate tables or surfaces that can be moved relative to one another. The position of the end of the optical fiber nearest the optical device is established. After establishing the positions, a table or surface is moved to bring the optical device and optical fiber into alignment.

Referring to independent apparatus claims 1 and 8, the claimed optical modules include the following (this is an abbreviated description of some of the actual claim elements):

> optical elements mounted on one surface of a substrate; and
>
> an optical fiber array formed with a first surface and a second surface that is opposite to and parallel with the first surface and having optical fibers with opposite ends exposed to the first and second surfaces.

According to these claims, the optical fiber array is mounted at its *second surface* to the substrate with the spacer interposed between them such that optical fiber ends exposed at the *first surface* are aligned with respective optical elements mounted on the substrate. In other words, the second ends of the optical fibers face toward the optical elements but alignment is achieved between the optical elements and the first ends of the optical fibers that face away from the optical elements.

Neither Masataka nor Nguyen teach an optical fiber array formed with opposite and parallel surfaces at which ends of optical fibers are exposed. Masataka discloses an optical fiber array terminal (12) having only one surface at which optical fiber ends are exposed (see Figs. 1 and 5). Nguyen does not disclose anything that adds to what is disclosed in Masataka.

Neither Masataka nor Nguyen disclose or teach the structure that is achieved by aligning optical elements (emitting or receiving elements) with the ends of optical fibers that face away from the optical elements. In contrast, Nguyen teaches aligning an LED with the end of an optical fiber that faces the LED. Masataka does not add anything relevant to what is disclosed in Nguyen.

With regard to independent method claims 5 and 12, the claimed methods include steps similar to the following (this is an abbreviated description of some of the steps in claim 5):

> passively aligning optical elements mounted on a substrate with first ends of optical fibers exposed at a first surface of an optical fiber array by image recognition thereof, where second ends of the optical fibers are exposed at a second surface of the optical fiber array that is opposite to the first surface; and
>
> mounting the optical fiber array at the second surface to the substrate with at least one spacer interposed.

Neither Masataka nor Nguyen disclose or teach using image recognition to align optical elements (emitting or receiving elements) with the ends of optical fibers that face away from the optical elements. In contrast, Nguyen teaches aligning an LED with the end of an optical fiber that faces the LED. Masataka does not add to what is disclosed in Nguyen.

All other claims are dependent on one of the independent claims discussed above and add further limitations thereto that are not disclosed or suggested by the cited art.

CONCLUSION

Applicants amend the claims as shown herein and request reconsideration in view of the discussion set forth above.

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Certificate of Transmission

I certify that this Response to Office Action and any following materials are being transmitted by facsimile on April 9, 2004 to the U.S. Patent and Trademark Office at telephone number (703) 872-9306.

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